

## Comparative Photo Sensitivity of Psoralen Derivatives

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A member of the furanocoumarin family, psoralen, derived from natural products such as some fungi, leguminous herbs, etc. has been used in the treatment of severe skin diseases like psoriasis, vitiligo, polymorphic light eruption, cutaneous T-cell lymphoma, etc. Psoralen is being used for ages till now. For example, it has been used for the treatment of vitiligo in the Middle East and Asia for 3000 years, and nowadays it is being used for the treatment of more than 30 skin diseases.<sup>1</sup> Psoralen is a powerful photosensitizing agent that boosts the amount of ultraviolet light absorption by the skin. It is also a DNA cross-linker.

Psoralen has some derivatives and the photo reactivity of each derivative is different. Though different psoralen derivatives have been used as an ingredient of medicine for a long time, yet the most photoreactive psoralen derivative is not determined till now. It is very important to find out the highest photoreactive psoralen derivative in order to obtain the most effective medicine. This experiment was conducted to find out the comparative photo reactivity of five different derivatives of psoralen namely 4, 5, 8-trimethylpsoralen, 8-methoxypsoralen, 8-hydroxypsoralen, 4' chloromethyl 4, 5, 8-trimethylpsoralen and 4' hydroxymethyl 4, 5, 8-trimethylpsoralen with DNA. For the experiment, DNA of palindromic sequence d(GCCTAGGC)<sub>2</sub> was used. Ultraviolet light of 365 nm wave length was applied to conduct the photoreaction and the HPLC technique was used to observe the end products after photoreaction. The highest photo reactivity with DNA was observed by 4' hydroxymethyl 4, 5, 8-trimethylpsoralen and the lowest was seen by 8-methoxypsoralen, 8-hydroxypsoralen.

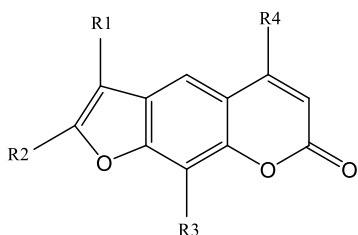


Fig. 1: Psoralen

**4, 5, 8-trimethylpsoralen:** R1= H, R2= CH<sub>3</sub>, R3= CH<sub>3</sub>, R4= CH<sub>3</sub>

**8-methoxypsoralen:** R1= H, R2= H, R3= CH<sub>3</sub>, R4= H.

**8-hydroxypsoralen:** R1= H, R2= H, R3= OH, R4= H.

**4' chloromethyl 4, 5, 8-trimethylpsoralen:** R1= CH<sub>2</sub>Cl, R2= CH<sub>3</sub>, R3= CH<sub>3</sub>, R4= CH<sub>3</sub>

**4' hydroxymethyl 4, 5, 8-trimethylpsoralen:** R1= CH<sub>2</sub>OH, R2= CH<sub>3</sub>, R3= CH<sub>3</sub>, R4= CH<sub>3</sub>

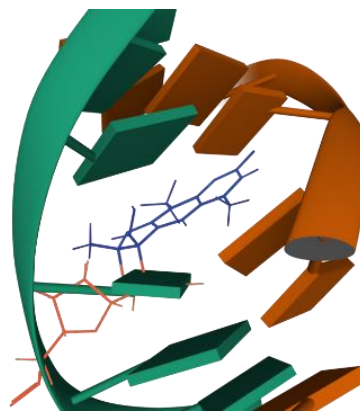


Fig. 2: Psoralen-DNA mono adduct

<sup>1</sup> B. .K Bhatia., H.W. Lim, I.H. Hamzavi, *Comprehensive Dermatologic Drug Therapy, Fourth Edition*, **2021**, 263- 270.